

# Change of Heart: Hanson and West Struve Slough

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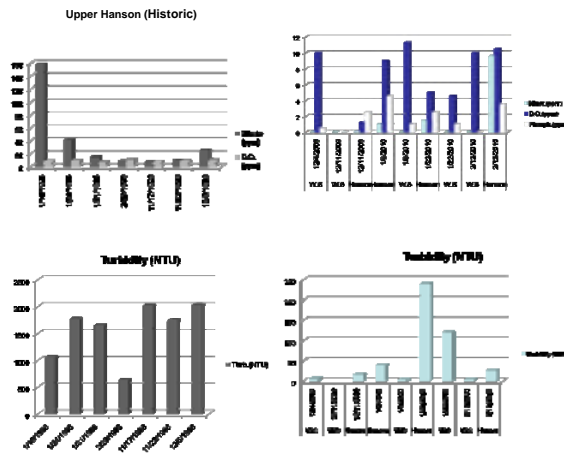
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## Introduction

As part of Watsonville, an agricultural based community, we aim to educate the community on the effects of agricultural runoff on our local sloughs and how it plays a vital role in our watershed. Our project compares the water quality of two different sloughs, Hanson Slough and West Struve Slough. Hanson Slough, located southwest of Pajaro Valley High School, is mainly impacted by agriculture due to the fields that surround it. West Struve Slough runs parallel on the Westside of Highway 1 next to Pajaro Valley High School and is fed by a natural spring. Our project also noted the biodiversity of the selected areas. We observed both the local area's animals and plants, and their general locations in relation to each other. We also created a map to show the different plant locations in the area. Since Agriculture is so important to our community, we feel the need to educate the public about our effects on our local environment.



Water Testing



Making Biodiversity Observations in West Struve Slough



West Struve Slough

## Conclusion

Our findings confirm our hypothesis to be correct; Hanson Slough (agricultural setting) does indeed have a larger amount of nitrates and phosphates compared to West Struve Slough (relatively pristine site). Generally, high levels of these nutrients can cause dissolved oxygen levels to decrease due to the process of eutrophication. In our findings, while nitrates and phosphates were higher in the agricultural setting, we did not observe dissolved oxygen levels to reach an unhealthy range. Even though nitrates and phosphates can have a negative effect on the dissolved oxygen, our findings did not show this. Whenever dissolved oxygen increases, the turbidity decreases and vice versa. Turbidity levels were much higher in '96 compared to the '09/'10 results. While there appear to be some effect on the water quality, we cannot draw conclusions as of yet. We had a limited timeframe, a total of 5 test dates over a 3 month span. Further research is needed to fully understand the effects of agriculture on Hanson Slough.

When we compare the historic water quality data with our data, we can see that there are some changes in nitrate and dissolved oxygen levels. Nitrate levels in '09/'10 are much lower than they were in '96. This seems to indicate that restoration can have a positive impact on the environment. Though land use may be a factor. Aside from our water testing, we also conducted biodiversity observations on the contrasting sloughs. We came to a conclusion that complemented our water quality data; restoration has a positive impact on ecosystems. Restoration led to shift in the composition of the bird community. It is now more suitable for a greater community of birds than it was in '96. The wooded restoration has made Hanson Slough more accommodating for native birds. Total number of bird species increased by 16, from 11 in '96 to 27 in '07, according to historic bird surveys. Although we did not get a chance to go into depth about the biodiversity in Hanson Slough, we did make observations about plants, animal signs and tracks. This data can be used by future researchers to conduct future studies. Our data inspired us to further restore Upper Hanson Slough, coming to fruition through a restoration map using our relatively pristine site, West Struve Slough, as a reference point. We can make a difference by restoring this land to create a habitat suitable for maintaining a diverse population of wildlife.



Water Testing in Hanson Slough

## Materials and Methods

To accomplish our mission we planned regular visits to the sloughs. We created a map of our field study sites to identify the locations and quantity of plants in the area. We observed the local topography and used it to review our results. Slope and amount of plants on the land were important variables in any possible runoff and erosion. For our biodiversity tests, we created a spread sheet to record data, including plants (native and non-native), animals, animal signs, temperature, weather conditions, location, date, and observations of the land. We recorded locations of plants on a GIS map which we made of the different areas, color coded to show plant diversity. We took a multitude of pictures of the wetlands and also recorded animal sounds. To mirror our observations on the land, we also tested the water. Our tests on the water included Phosphates, Nitrates, Turbidity, pH, Dissolved Oxygen, and salinity. To accomplish these tests, we used the Winkler Method, a thermometer, Macherey Nigel pH strips, LaMotte Kit, VeGee Refractometer, plant and animal guides, a data chart, binoculars, Nokia phones, and GPS units. All in all, we had everything we needed to complete our project in a timely and successful manner.

### Hanson Slough Bird Population

Controlled	1 yr Restored (97)	Spring (2007)	Winter (2007)
14	13	13	15
Black Phoebe			Black Phoebe
Brewers Blackbird			
Brown-Headed Cowbird		Brown-Headed Cowbird	
European Starling		European Starling	
House Finch	House Finch		House Finch
House Sparrow			
Purple Finch			
Northern Oriole			
Red-Tailed Hawk	Red-Tailed Hawk	Red-Tailed Hawk	Red-Tailed Hawk
Red-Winged Blackbird	Red-winged Blackbird		
Turkey Vulture			
Yellow-Headed Blackbird			
Rock Dove			
Black-Crowned Night Heron			
Black-Shouldered Kite			
Brown Towhee			
California Quail			California Quail
Cinnamon Teal			
Common Raven			
Common Yellowthroat			Common Yellowthroat
Lincoln's Sparrow			
Orange-Crowned Warbler			
Song Sparrow	Song Sparrow	Song Sparrow	Song Sparrow
American Kestrel			
Chiffchaff			
Bucconid			
Yellow Warbler			
Coyote Bush			
Black-Headed Grosbeak			
California Towhee			
Western Meadowlark			
American Goldfinch			
Red-Shouldered Hawk			
Downy Woodpecker			
American Pipit			
Black Phoebe			
Yellow Rumped Warbler			
Golden-Crowned Sparrow			
White-Crowned Sparrow			
Barnard's Wren			
American Robin			

Highlighted Birds=Birds

### Biodiversity Observations

Location	Date	Native Plants	Non-Native Plants	Animal Signs	Animals	Weather
HS-1	8/10/2009	Blackberry	Poison Hemlock			Sunny, slight cloud cover
UPW	11/8/2009	Coffeeterry, Western Ruch, Coyote Bush, Willow Tree	Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	coyote scat	Black Shouldered Kite, Frog, Blue Jay	sunny, slight cloud cover
HS-1	12/11/2009	Blackberry	Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	coyote scat	Great Egret	100% cloud cover, rain
UPW	12/11/2009	Coffeeterry, Western Ruch, Coyote Bush, Willow Tree	Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	coyote scat		100% cloud cover, rain
HS-1	12/4/2009	Blackberry	Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	coyote scat		Sunny
UPW	12/4/2009	Coffeeterry, Western Ruch, Coyote Bush, Willow Tree	Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	coyote scat		Sunny Cloud Cover/Rain 7.9 C
HS-1	12/11/2009	Blackberry	Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	Frog Croaks	Mallards Frog	Cloud Cover/Rain 7.9 C
UPW	12/11/2009	Coffeeterry, Western Ruch, Coyote Bush, Willow Tree	Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry			80% Cloud Cover
HS-1	1/22/2010	Blackberry	Poison Hemlock, Wild Radish, Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	Coyote Scat	Red Tailed Hawk	80% Cloud Cover
UPW	1/22/2010	Coffeeterry, Western Ruch, Coyote Bush, Willow Tree	Poison Hemlock, Wild Radish, Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	Coyote Scat		100% cloud cover, overcast
HS-1	1/8/2010	Blackberry	Poison Hemlock, Wild Radish, Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry	Deer Hooves, Coyote Scat, Feathers		100% cloud cover, overcast
UPW	1/8/2010	Coffeeterry, Western Ruch, Coyote Bush, Willow Tree	Poison Hemlock, Wild Radish, Bristly Ox, Young Wild Radish, Curly Dock, Italian Thistle, Himalayan Blackberry			100% cloud cover, overcast

HS=Hanson Slough UPW=Upper West Struve Slough



## Literature Cited

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